VII. Bureau/Office Mission Critical and Embedded Systems

Bureau/Office Mission Critical Systems

Each of the Department's bureaus and offices will be held responsible for developing and monitoring specific strategies and Y2K milestones as they replace or repair their mission critical systems, hardware (noted earlier), and embedded systems. The chart below depicts the number of mission critical systems identified for each bureau or office. (An expanded detail of each system is provided in Appendix D.) These numbers include the systems identified in the CIO's information technology portfolio. These applications will be monitored and updates provided to the CIO for inclusion in the Quarterly Y2K Update Report provided to the Office of Management and Budget.

Mission Critical System's Status as of December 1998								
Bureau/Office	***Total M-C Systems***	***Compliant***	***Compliant by Repair***	***IV&Ved***	***To Be Replaced***	***To Be Repaired***	***To Be Retired***	***Cost***
OS	10	10	8	4	0	0	0	**$7,423,000**
USGS	13	12	12	12	0	1	0	**$19,773,000**
NPS	2	2	1	2	0	0	0	**$20,047,000**
OSM	16	16	16	15	0	0	0	**$850,000**
FWS	2	2	0	2	0	0	0	**$854,000**
BLM	12	10	10	9	0	2	0	**$6,586,000**
MMS	4	4	4	4	0	0	0	**$2,010,000**
BIA	15	14	13	12	0	1	0	**$21,896,000**
BOR	16	16	16	14	0	0	0	**$3,622,297**
Totals	90	86	80	74	0	4	0	**$83,061,297**
%	100%	96%	95%	82%	0%	4%	0%	

Embedded Systems

The DOI Y2K project team is currently collecting information concerning the Y2K embedded chip challenge. Embedded system technology exists throughout the Department's 50,000 buildings, 34,000 vehicles, 100 plus aircraft, and 200 laboratories.

A pilot is underway to inventory and assess those microchips and embedded software that will cause critical mechanical systems to fail or which affect lifesaving equipment or security systems. This pilot is being conducted by the National Park Service at the Grand Canyon National Park (GRCA). The GRCA has large fee collection, fire, law enforcement, maintenance, resource management, science, and search and rescue programs as well as an extensive administrative workload. The GRCA is a prime example of a Departmental unit with a large inventory of various equipment, much of which may contain embedded microchip technology. Some types of

equipment, if not Y2K compliant, may present health and safety risks. Additionally, in order to service nearly five million visitors annually, the park must understand what equipment in their inventory relies on date stamp records and must be repaired, replaced or retired in order to maintain a safe, efficient, legal and cost effective operation.

The results of this inventory were made available in late 1997 and are used to alert all DOI offices and bureaus about potential problems in their embedded systems. An inventory of those problems will serve as the basis for discussions with manufacturers and suppliers on ways of repairing or replacing these embedded systems prior to failure and estimating any costs.

BIA Pilot

In April 1997, a proof of concept pilot was undertaken by the BIA in its Albuquerque, New Mexico data center. This pilot, using commercially available software from Platinum Technologies, was funded on a pro rata basis by each bureau and office. The purpose of the pilot was to examine one of the industries leading software tools for its potential use in DOI's Y2K effort. Running against one of the BIA's CIO portfolio systems, Land Record Information System (LRIS), the tool processed over half a million lines of code looking for date-related references.

The reports generated by the automated tool showed the effort and cost to make the application software Y2K compliant, using either the procedural approach or the date field expansion approach. The date field expansion approach is used to increase the actual physical or logical size of a date-related data element. Another approach uses a procedural fix to cause the application to properly process dates that cross century boundaries. It does not expand the date, as the date field expansion approach, but rather this method makes appropriate logic changes to keep the system working properly.

Using this automated tool, of the half million lines of code, about 5 percent contained date-related references or calculations. The tool projected that converting these specific executable LOC using the date field expansion technique would cost about $27,500 (using the DOI cost per LOC of $1.10 for the affected 25K LOC only). The tool also showed that by using the procedural approach, the effort would cost about half (or about $14,000, still using only the affected LOC) to make the same set of executable LOC Y2K compliant. Platinum Technologies has informed the Department that while the latter approach seems to be the obvious choice from a strictly low-cost perspective, we understand that it is difficult to assure 100% correction in many instances, since dates may be moved to fields that are not identified as date structures and remain hidden from programmers.

We believed that an automated tool, such as Platinum's, would help with BIA's conversion efforts, but were not able to justify the price/performance of the Platinum tool and began looking at others.

In the mean time, we will continue to use our initial cost estimate of $68,000 for the repair of the LRIS, since the pilot was not run against all of its source code. We also believe that automated

tools, in general, will allow us to beat the impending deadline and save resources, but bureaus and offices should move quickly to assess and acquire the appropriate tools for their organization's requirements.

BIA has since piloted the Millennium Solutions tool from Data Integrity, Inc. and found that it was more suitable to their particular environment. The acquisition process has completed and the tool is being used in their renovation process. So far, reports have been very positive and BIA's code renovation has accelerated dramatically. New completion schedules for the Renovation Phase are now expected to show completon before the end of summer.

BIA has also brought Mitretek onboard to assist with the re-assessment of their information systems and help develop a comprehensive Y2K plan that will allow BIA to remediate their systems before March 1999.